

Appl. No. 10/510,417
Amdt. Dated July 16, 2009
Reply to Office Action of March 16, 2009

• • • R E M A R K S / A R G U M E N T S • • •

The Official Action of March 16, 2009 has been thoroughly studied. Accordingly, the following remarks are believed to be sufficient to place the application into condition for allowance.

By the present amendment claims 15-18 have been canceled.

Independent claims 1, 5 and 13 have been changed to recite that the piston is formed in a cup shape with an outer peripheral surface and a cylindrical hollow portion inside which piston reciprocates inside the cylinder as the outer peripheral surface slides directly on an inner wall of the cylinder.

Independent claim 1 has also been changed to recite that the cylinder and cylinder head are made of a resin and are ultrasonically welded together.

Independent claims 5 and 13 have been changed to recite the recessed portion, coupling ring and connecting ring.

Independent claim 13 has been changed to recite further steps in the process of producing the piston pump.

Support for the changes to the claims can be found at lines 12-15, page 4; lines 1-11, page 10; lines 4-16, page 14; lines 2-7, page 21; lines 23-27, page 21; lines 21-24, page 28; and line 26, page 29-line 25, page 30 in the specification.

Applicant submits that no new matter is added.

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Entry of the changes to the claims is respectfully requested.

Claims 1-11 and 13 remain pending in this application.

Claims 1, 2, 4, 7 and 10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Japanese reference No. 8-189468 to Oshiage et al. in view of U.S. Patent No. 6,024,366 to Masamura and further in view of U.S. Patent Application Publication No. 2003/0206817 to Oh et al.

Claims 5 and 6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,193,109 to Credle, Jr. et al. in view of Oshiage et al. and further in view of Oh et al.

Claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Oshiage et al. in view of Masamura and further in view of U.S. Patent No. 5,188,519 to Spulgis.

Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Oshiage et al. in view of Masamura and further in view of U.S. Patent No. 3,931,755 to Hatridge.

Claim 11 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Oshiage et al. in view of Masamura and further in view of U.S. Patent No. 4,343,314 to Sramek.

Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,082,244 to Sigel et al. in view of U.S. Patent No. 5,848,879 to Hansson and further in view of U.S. Patent No. 5,847,264 to Martin et al.

Claims 15, 16 and 18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Oshiage et al. in view of Spulgis.

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Claim 17 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Oshiage et al. in view of Credle, Jr. et al.

For the reasons set forth below, it is submitted that all of the pending claims are allowable over the prior art of record and therefore, each of the outstanding prior art rejections of the claims should properly be withdrawn.

Favorable reconsideration by the Examiner is earnestly solicited.

Initially it is noted that the prior art rejections of claims 14-18 is moot inasmuch as these claims have been canceled.

Claim 1

Claim 1 is amended to recite that the piston is formed in a cup shape with an outer peripheral surface and a cylindrical hollow portion inside which reciprocates inside the cylinder as the outer peripheral surface slides directly on an inner wall of the cylinder.

Oshiage et al. discloses a piston pump that includes a lip seal. The lip seal is indispensable to Oshiage et al.

As indicated on the cover of the Oshiage et al. reference, the "purpose" of the invention is to "suppress raise in temperature in a sealing so as to accomplish improvement of durability and prolongation of a life in the sealing member."

The lip seal (18) of Oshiage et al. is provided between the piston and the chamber housing the piston.

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In applicants' independent claim 1 the outer peripheral surface of the piston slides directly on the inner wall of the cylinder housing the piston without the lip seal therebetween.

In addition claim 1 further recites that the inner diameter of the cylinder is adaptably formed not exceeding 20 mm and it is almost impossible or at least not practical to provide a lip seal within a chamber having an inner diameter that does not exceed 20 mm.

Accordingly, it is submitted that Oshiage et al. actually teaches away the invention set forth in applicants' independent claim 1.

Applicants respectfully remind the Examiner of MPEP 2144.05 in which it is stated that: An applicant can rebut a presumption of obviousness based on a claimed invention that falls within a prior art range by showing "(1) [t]hat the prior art taught away from the claimed invention...or (2) that there are new and unexpected results relative to the prior art." *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1322, 73 USPQ2d 1225, 1228 (Fed. Cir. 2004).

Claim 1 further recites that the cylinder is made of a resin and the cylinder head is made of a resin and that the cylinder and cylinder head are welded together by ultrasonic welding.

The Examiner relied upon Masamura as teaching a cylinder head that is connected to a cylinder by welding.

Masamura discloses a suspension apparatus with a pair of hydraulic dampers disposed on left and right sides of a vehicle, an upper end side of which is connected to a vehicle body side and

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a lower end side is connected to an axle side, and a pressure regulating cylinder communicating with piston side oil chambers a of the pair of hydraulic dampers (Abstract).

At column 10, lines 57-63 Masamura discloses that the head cap member 28 is connected to the upper end of the cylinder body 24 by welding (indicated by symbol M). Because the front side chamber h is set to an oil chamber (column 5, lines 44-45), the welding may be made oil-tight. Because the suspension apparatus is used for the vehicle body as a damper, it must sustain a very high pressure and the head cap member 28 and the upper end of the cylinder body 24 must be made of metal and welded (metal welding).

In contrast, in the present invention as set forth in claim 1, the cylinder and cylinder head are made of a resin and are connected together by ultrasonic welding. This type of welding is only applicable to resins and not applicable to metals.

Independent claim 1 recites that the piston reciprocates inside the cylinder with predetermined air-tightness. Masamura only requires oil tightness. Since air is a compressible fluid, the seal requirement and the holding air pressure is different than the seal requirement for oil which is non-compressible.

Further, since the invention set forth in claim 1 is a piston pump that is designed and constructed for use in a blood pressure measurement device, it is impossible to use an oil-based piston pump because the piston pump must compress air or an equivalent compressible gas.

Therefore, it is submitted that Masamura actually teaches away the present invention set forth in independent claim 1.

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In any event, independent claim 1 recites that the piston is formed in a cup shape with an outer peripheral surface and a cylindrical hollow portion inside such that the sliding outer peripheral surface of the piston has enough area to seal the pump chamber defined by the cylinder and the piston.

Since none of the cited references discloses such structure, it is submitted that claim 1 would not have been obvious over the cited references.

Claims 2-4, and 7-11

Since claims 2-4 and 7-11 are each dependent from independent claim 1 and claim 1 is patentable over the cited references, it is submitted that claims 2-4 and 7-11 are each patentable over the cited references.

Claim 5

Credle, Jr. et al teach a pump that is specifically designed and configured to mix two different liquids and dispense the resulting mixture. As shown the pump includes a plunger assembly 50 that includes a second valve 40 provided therein. The pump includes two inlets and a single outlet. A first valve 30 is provided adjacent one of two. In operation as the plunger assembly 50 moves upward it draws liquid into one of the inlets 17. As the plunger assembly 50

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moves downward it draws liquid into the other inlet 13 which mixes with the liquid that was previously drawn into inlet 17.

Independent claim 5 recites a number of structural features that distinguish over Credle, Jr. et al.

For example, claim 5 recites that the piston is formed in a cup shape with an outer peripheral surface and a cylindrical hollow portion inside, the piston reciprocating inside the cylinder as the outer peripheral surface slides directly on an inner wall of the cylinder.

It is noted that the plunger assembly 50 of Credle, Jr. et al. is not in the shape of a cup.

Independent claim 5 further recites the piston pump includes: a recess portion disposed continuously around an inner wall of the cylindrical hollow portion in a circumferential direction of the piston; a coupling ring having a projection portion to fit on the recess portion such that the coupling ring engages with the piston wherein the cylindrical hollow portion communicate with a center portion of the coupling ring; and a connecting ring connected to the coupling ring to transmit mechanical force.

Credle, Jr. et al. does not teach any of these claimed structural features.

In combining the teachings of Credle, Jr. et al, and Oshiage et al. the Examiner has relied upon Oshiage et al. as "a similar pumping arrangement to pump gas."

The Examiner's position is not well taken, because it is unclear how a rocking piston (Oshiage et al.) is "similar" to a beverage mixing/dispensing assembly (Credle, Jr. et al).

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The Examiner has relied upon Oh et al, as teaching a suction valve assembly for a reciprocating compressor whereby the suction valve is fixed to the cylinder by a bolt 60 through a hole 113 for receiving the bolt.

The Examiner takes the position that it would have been obvious to "have modified the nominally attached suction valve of the pump of the art above with the fixed suction valve of Oh."

The modification of Credle, Jr. et al, in view of Oh et al. proposed by the Examiner would not overcome the structural and functional differences between Credle, Jr. et al, and the invention recited in independent claim 5.

Claim 6

Since Claim 6 is dependent from independent claim 5 which is patentable over the reference combination, it is respectfully submitted that dependent claim 6 is also patentable for similar reasons.

Claim 8

In rejecting dependent claim 8 the Examiner has relied upon Spulgis as teaching a piston (14,26) with a recess portion formed continuously in the circumferential direction of the piston and engaged with a coupling member (38), the recess portion including at least a part of a first predetermined spherical surface; wherein the coupling member has a projection portion formed

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continuously in the circumferential direction such that the projection portion corresponds to the recess portion, the projection portion including at least a part of a predetermined second spherical surface to engage with the recess such that the projection portion is capable of turning in the circumferential direction and in an axial direction.

Spulgis discloses a reciprocating pump utilized with liquid oxygen or nitrogen as pumping fluid (lines 20-30, col. 1). Since the ball is totally different from the coupling ring of claim 5, Spulgis does not disclose, teach, or suggest applicants' claimed coupling ring. Further, Spulgis discloses the pump, in which cavitation should be avoided, works with non-compressible fluid (Abstract).

Although the Examiner states that Spulgis teaches a cylindrical ring-shaped stem 26 that includes a hollow portion for receiving the ball 38, it is submitted that Spulgis states in lines 39-51, col. 3:

The valve means 24 comprises a cylindrical stem 26 with a circumferential disk 28 at its base to provide a flat sealing face 30 which, when seated against the boss 22, closes the conical bore 20 to liquid passage. The stem 26 is coupled to a push rod 32 by a ball coupling comprising a short rod extension 34 terminating in a ball 38. The stem 26 has a hollow chamber 40 with hemispherical bottom sides conforming to the dimensions of the ball 38, and an opening through which the rod extension 34 passes to connect to the push rod 32. The stem 26 and disk 28 are thus permitted to swivel around the ball 38 to seek a flat seating of its sealing face 30 against the boss 22.

Therefore, it is submitted that the cylindrical stem 26 has the disk 28 at its base to provide a flat sealing face 30 to close the conical bore and the hollow chamber 40 does not form a ring shape structure as required by applicants' claimed invention. Spulgis discloses that the hollow

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chamber 40 in cylindrical stem 26 has a circular opening on the top face through which the short rod extension 34 passes. The cylindrical stem does not have the shape of a ring. As shown in the figures.

At column 4, lines 19-24 Spulgis teaches:

When the descending piston compresses the liquid trapped between the conical bore 20 and housing 50, the increased fluid pressure is transmitted to the ball valve 60 and compresses the spring 62 sufficiently to allow the trapped liquid to discharge through the outlet channel.

Further at column 4, lines 27-33, col. 4 Spulgis teaches:

The piston 14 also has conventional guide rings 66 and seal rings 68. If desired, a resilient "friction ring" 70, compatible with cryogenic service, can be provided which prevents the piston from sliding downward under its own weight before the valve disk "catches up" with the valve seat on the piston and builds up pressure in the pumping chamber.

Therefore, pressure increase is necessary for Spulgis prior to discharging fluid.

Such a process is not at all compatible or properly combinable with either Oshiage et al. or Masamura.

Accordingly the Examiner's assertion is respectively traversed.

Further, it is impossible to utilize the lip seal of Oshiage et al. with the pump of Spulgis because there is no space for the lip seal around the piston (see Fig. 1).

As noted above, Spulgis teaches a resilient "friction ring" 70, compatible with cryogenic service, can be provided, if desired to prevent the piston from sliding downward under its own

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weight before the valve disk "catches up" with the valve seat on the piston and builds up pressure in the pumping chamber.

Accordingly, conventional seal rings, guide rings, and frictional rings are provided around the piston 14 so that no space is available for the lip seal of Oshiage. Moreover the seal rings have to be compatible with cryogenic fluids, which implies that the heat problem of the lip seal upon which Oshiage is focused is irrelevant to the seal rings of Spulgis.

Therefore, if Oshiage and Spulgis were combined the resulting pump would be inoperable

Accordingly it is submitted that applicants' claimed invention would not have been obvious over the cited references.

Claim 13

Claim 13 includes the steps of:

producing a piston pump pre-assembly;

conducting a leakage inspection;

repairing or discarding the piston pump pre-assembly if it fails or proceeding with manufacturing if it passes;

fitting a valve into a hole on the top of the piston so as to cover the suction port thereon;

press-fitting a coupling ring into a recess portion;

press-fitting a crank shaft to a driving shaft of a motor;

inserting the crank shaft into the connecting ring; and

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inserting the piston into the cylinder of the piston pump pre-assembly.

These steps are not disclosed, taught, or suggested by any of the cited references. Therefore, the invention of claim 13 would not have been obvious over the cited references.

On page 12 the Examiner argues that:

The limitation added to claims 1 and 5 that an inner diameter of the cylinder does not exceed 20mm such that the piston can be utilized in a blood pressure measuring device constitutes a change in size that fails to patentably distinguish over the art of record as it is just a scaling down of the art of record. See rejection above and MPEP 2144.04(4)(a):

MPEP 2144.04(4)(a) recites:

In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955) (Claims directed to a lumber package "of appreciable size and weight requiring handling by a lift truck" where held unpatentable over prior art lumber packages which could be lifted by hand because limitations relating to the size of the package were not sufficient to patentably distinguish over the prior art.); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976) ("mere scaling up of a prior art process capable of being scaled up, if such were the case, would not establish patentability in a claim to an old process so scaled." 531 F.2d at 1053, 189 USPQ at 148.).

In re Rinehart is not applicable since this case involves scaling up a chemical process.

In *In re Rose* the court of appeals held that a package of wood that was small enough to be hand carried was not patentable over a package of wood that had to be handled by a lift truck.

The facts in *In re Rose* are not applicable to the present situation, because the size difference in applicants' claimed pump relates directly to functional differences.

In re Rose the court of appeals cites *In re Yount*, 80 USPQ 141 (CCPA 1948).

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In *In re Yount* the court of appeals held that appellant's arguments as to distinctions between large bags (the argued invention) and small bags of the prior art were unconvincing because the claims did not specify a large bag and appellant's specification states "the invention is also applicable to the fabrication of relatively smaller bags."

In *In re Yount* the court of appeals cited *In re Kirke*, 5 USPQ 539 (CCPA 1930).

In *In re Kirke* the issue argued before the court was whether tests performed on a miniature boiler (taught by the prior art) were applicable to a large boiler (the claimed invention).

The court of appeals held that the prior art taught that the tests performed on the miniature boiler "holds good to a great extent with larger boilers."

The Examiner will note that neither the MPEP nor the case law cited therein supports that Examiner's broad position that size does not matter.

When differences in size directly effect function, utility differences and the like, such differences can patentably distinguish over the prior art.

As an example, in the present situation it is clear that the size of the engine piston in Oshiage et al. is not applicable for use in a blood pressure measuring device - as is applicants' pump. The same argument holds true for each of the other prior art references.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a prima facie case of obviousness of applicants' claimed invention.

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It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.


Entry of the present preliminary amendment and an early examination of the application are respectfully requested.

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

If upon consideration of the above, the Examiner should feel that there remains outstanding issues in the present application that could be resolved, the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,



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